ADDENDUM SOILS INVESTIGATION
KUIKAHI GARDENS, KALIHI STREET
KALIHI-UKA, HONOLULU, HAWAII

W. O. 344-10 AUGUST 13, 1973

FOR

MID-PAC DEVELOPMENT, LTD.

GEOLABS-HAWAII, INC.
1553 COLBURN STREET, SUITE 203
HONOLULU, HAWAII 96817

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GEOLABS-HAWAII, Inc.
Soils and Foundation Engineering, Geology
1553 Colburn Street, Suite 203 • Honolulu, Hawaii 96817 • (808) 841-5064

August 13, 1973

W. O. 344-10

Mid-Pac Development, Ltd.
P. O. Box 1719
Honolulu, Hawaii 96806

Attention: Mr. Terrance Wong

Subject: Addendum Soils Investigation
Kuikahi Gardens, Kalihi Street
Kalihi-Uka, Honolulu, Hawaii
Tax Map Key: 1-4-15:50

Reference: Geolabs Report:
Soils & Foundation Investigation
Kuikahi Gardens, Kalihi Street
Kalihi-Uka, Honolulu, Hawaii
Dated June 16, 1972

Gentlemen:

Submitted herewith are the results of the additional exploration performed on the subject property at your request.

The purpose of the additional investigation were (1) to determine the stability of the natural descending ridge above the latest proposed development area, as requested by the Department of Public Works, and (2) to determine subsurface conditions in an area that was added on to the project after the issuance of the referenced soils report.

REVISED DEVELOPMENT

The development, as presently proposed, will consist of a total of 40 two-story 3 and 4 bedroom units, to be constructed within the larger area. Parking for some of the units will be under the structures, incorporating a semi-basement type design by the construction of retaining walls below grade. Considerable grading and retaining wall construction will be required to provide building sites.

FIELD EXPLORATION

Nine additional borings were drilled with a B-40 truck mounted drill rig, utilizing a 4-inch diameter solid stem soil auger. The location of the borings are shown on Plate 1 and the boring logs are contained in Appendix A of this report.

In all borings, Standard Penetration Tests were taken at selected depth intervals. The Standard Penetration Test consists of driving a 2-inch O. D. split spoon sampler 18 inches with a 140-lb. hammer free-falling a distance of 30 inches. The number of blows required to drive the sampler the last 12 inches is termed the "Standard Penetration Resistance" (N) and is an approximate measure of the relative density or consistency of a soil. These resistance values are plotted on the boring logs. Samples obtained were visually classified in the field and

representative material was placed in air-tight containers and returned to our laboratory for testing.

The previous test pit and borehole information was supplemented by additional geologic reconnaissance and the new boring program. All geologic data has been plotted on the "grading plan", Plate 1 and the cross sections, Plates 2 and 3.

SOILS

General descriptions of soil types encountered were detailed in the referenced report. However, additional soils data has been obtained from the latest investigation.

The black expansive boulder clay (fill)?, reported in our earlier report has been outlined in greater detail on Plate 1. The upper portions of the makai side of the property contains a deposit of dumped fill. A considerable amount of fill containing excessive moisture is also present on the lower portion of the makai side of the property. These fill deposits were apparently dumped on the site during the Likelike Highway construction. Ponded water approximately 2 feet deep was observed in one area near boring B-5A. This is apparently caused by runoff accumulating in a surface depression. Boundaries of all encountered fill are outlined on Plate 1.

A thin (1 ft. to 4 ft.) layer of black, expansive, boulder clay overlies a considerable portion of the makai side of the site.

Areas of trash fill, have again been noted on Plate 1.

HISTORY OF SLIDING

Geologic reconnaissance and test pit and boring inspection on the property by our geologist did not disclose any evidence of slides.

A discussion between Mr. Brooks Anderson, our geologist, and Mr. Terry Aratani of the Testing Division, Highway Department, Department of Transportation on August 2, 1973 revealed the following information:

Slides along the mountain side of the Likelike Highway occurred in cuts originally sloped at 3/4:1. When the cuts were trimmed back to approximately 2:1 or less, the sliding was generally stabilized.

Mr. Aratani suggested that there might be a formal report covering the slides on the Likelike Highway at the District Office of the Highway Division. However, Mr. Sasaki at the District Office indicated that his department did have some highway cross sections but, that he did not know of any report.

Based upon examining the site, road sections, road cuts and fills and upon discussions with personnel of the Highway Division involved in the construction of the Likelike Highway, the following conclusions have been drawn by our geologist:

1. The well known highway slides appear to be related to the over steepening of the Likelike Highway cuts during construction. Hence, the slides were a construction problem and not directly related to the inherent geologic stability of the site.

2. A slight lateral movement of the toe of the high (60 to 70 feet) fills on the Likelike Highway approximately 500 to 1000 feet makai and above the subject site, is apparently due to the steepness (approximately 1:1) and height of the unbenched fills. This movement was apparently not caused by any inherent instability of the highway site. No visual evidence of instability or sliding directly above the subject development site was noticed, either from visual reconnaissance, boring data, or laboratory inspection of samples.

DISCUSSION AND RECOMMENDATIONS

Based upon the subsurface investigation, laboratory testing, and engineering analyses; the following recommendations pertain to

the stability of the natural ridge above the project and to the general development of the site:

1) The conclusions and recommendations of the referenced report dated June 16, 1972 remain applicable unless specifically superseded by this report.

2) Our geologic reconnaissance, subsurface exploration and laboratory inspection and testing did not reveal any evidence of landsliding or geologic instability on the site.

3) Stability analyses were performed on Cross Section B-B', which represents the steepest natural slope configuration as shown on Plate 2. The analyses indicate that the natural slope possesses a safety factor of at least 1.5 and is therefore considered to be stable.

4) The makai portion of the site, as shown by the boundary on Plate 1, was moist to very wet depending on location. Removal of up to 10 feet of the soft wet material and replacement with compacted fill will be necessary prior to construction of buildings in this area. Also in this general area, verification of the existence of a dumped fill from highway construction was obtained. This fill will basically affect the four unit building complex shown on Plate 1 where it overlaps these building sites. Foundation loads for

these structures should either be transferred to competent bearing soil below the fill or be founded on recompacted structural fill in accordance with our original recommendations.

5) Where encountered, structural footings should also be founded below the surficial "adobe" layer. The "adobe" (highly expansive black clay) is also not recommended for slab support. Therefore, where applicable, removal of all the black clay beneath slabs and replacement with material of lesser expensive qualities should be planned. The depth of this black clay will generally be less than 4 feet in thickness.

6) The onsite brownish silty clay to clayey silt has been found to be moderately expansive (5 to 6% under a surcharge of 60 psf). Foundations should reflect this condition and be designed in accordance with recommendations presented in the original report.

7) The vegetation on the site is extremely thick in certain areas. As a result, the topography, as shown on Plates 1 through 3, is only very approximate. It is believed that in various areas, the topography may be considerably steeper than shown on the present topography map. This

could affect the overall stability, if structures are situated in close proximity to a relatively steep descending slope. It is therefore recommended that the site be inspected by the soil engineer, after clearing operations have been completed, to compare the actual topography with that used for stability analyses. If a substantial steepening is evident, the stability analyses should be rechecked, based upon actual topographic data.

8) Generally, where buildings are proposed in close proximity to relatively steep descending slopes, the footings should either be deepened as necessary to be founded below a 1-1/2:1 plane drawn upward from the toe of the slope, or the specific slopes should be analyzed for stability when the actual configuration is known. If found to be satisfactory, the footings may then be founded in accordance with normal setback criteria. The soil engineer should inspect these areas, as mentioned above, and determine the best course of action.

We appreciate the opportunity to be of continued service. If you need any clarification of the recommendations of this report, please call.

Respectfully submitted,

GEOLABS-HAWAII, INC.

Robert S. Levinson
Chief Engineer

John J. Heneghan, P. E.

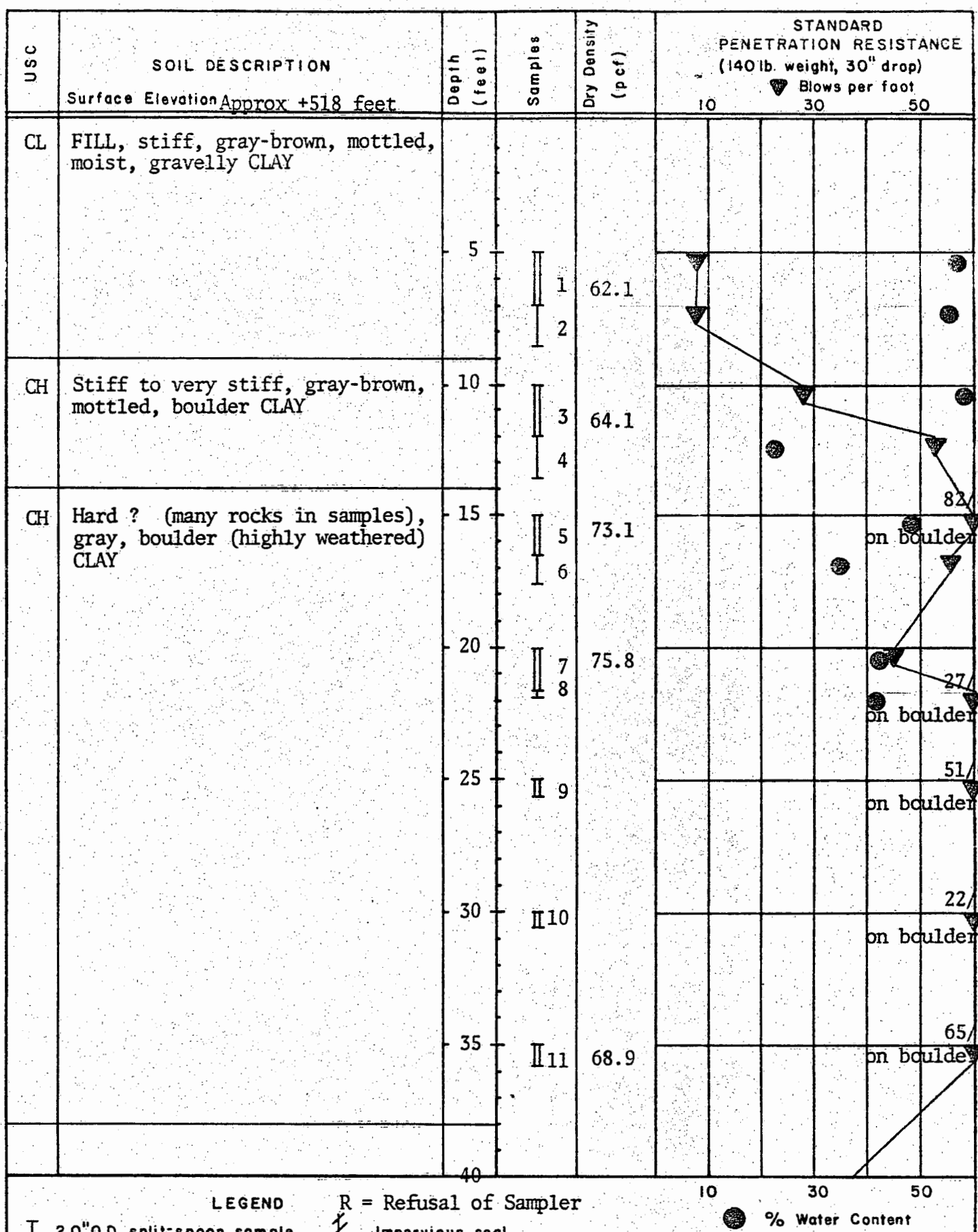
RSL/JJH:hlg

JOHN J. HENEGHAN
REGISTERED PROFESSIONAL ENGINEER
No. 3285
HAWAII, U.S.A.

xc: (3) Addressee
(1) Frank Slavsky & Associates, Inc.
(2) Fukunaga & Associates, Inc.

APPENDIX A

Boring Logs



LEGEND

R = Refusal of Sampler

I 2.0" O.D. split-spoon sample

II 2.5" O.D. ring sample

III Core sample

* Sample not recovered

Liquid limit

Natural water content

Plastic limit

Impervious seal

Water level

Piezometer tip

P Sampler pushed

USC Unified Soil Classification

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii

LOG OF BORING NO. 1A

W. O. 344-10 AUGUST 1973

GEOLABS-HAWAII, INC

SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. +518 feet	Depth (feet)	Samples	Dry Density (pcf)
CL	Hard to very stiff, brown, speckled, gravelly (highly weathered), sandy , Silty CLAY	40	12	68.6
		45	13	52.2
		50	14	
	Boring Completed 6-27-73 No Subsurface Water Encountered	55		

STANDARD PENETRATION RESISTANCE
(140 lb. weight, 30" drop)
▼ Blows per foot

10 30 50

73.5

10 30 50
● % Water Content

LEGEND

I 2.0"O.D. split-spoon sample
II 2.5"O.D. ring sample
III Core sample
* Sample not recovered
Liquid limit
Natural water content
Plastic limit

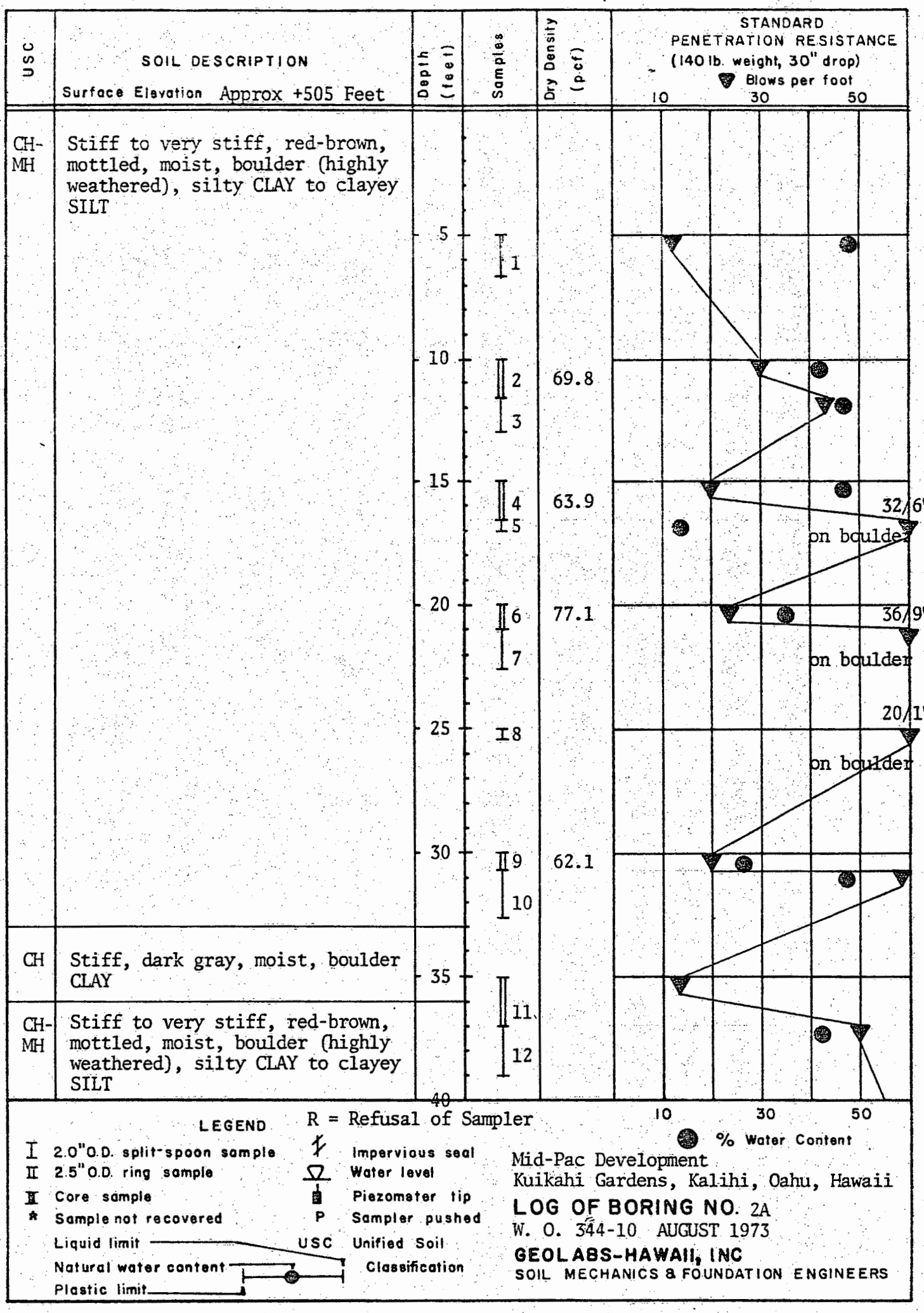
Impervious seal
Water level
Piezometer tip
P Sampler pushed
USC Unified Soil Classification

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii

LOG OF BORING NO. 1A (continued)

W. O. 344-10 AUGUST 1973

GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS


USC
SOIL DESCRIPTION
Surface Elevation Approx +505 Feet
Depth (feet)
Samples
Dry Density (p.c.f)
STANDARD PENETRATION RESISTANCE
(140 lb. weight, 30" drop)
Blows per foot
10
30
50
CH-MH
Stiff to very stiff, red-brown, mottled, moist, boulder (highly weathered), silty CLAY to clayey SILT
5
10
15
20
25
30
35
40
1
2
3
4
5
6
7
8
9
10
11
12
69.8
63.9
77.1
62.1
32/6"
on boulder
36/9"R
on boulder
20/1"R
on boulder
CH
Stiff, dark gray, moist, boulder CLAY
CH-MH
Stiff to very stiff, red-brown, mottled, moist, boulder (highly weathered), silty CLAY to clayey SILT
LEGEND
I 2.0"O.D. split-spoon sample
II 2.5"O.D. ring sample
III Core sample
* Sample not recovered
Liquid limit
Natural water content
Plastic limit
R = Refusal of Sampler
Impervious seal
Water level
Piezometer tip
P Sampler pushed
USC Unified Soil Classification
% Water Content
Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 2A
W. O. 344-10 AUGUST 1973
GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. +505 FEET	Depth (feet)	Samples	Dry Density (pcf)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
		40	I 13		● ▼
	Boring Completed 7-24-73	45			

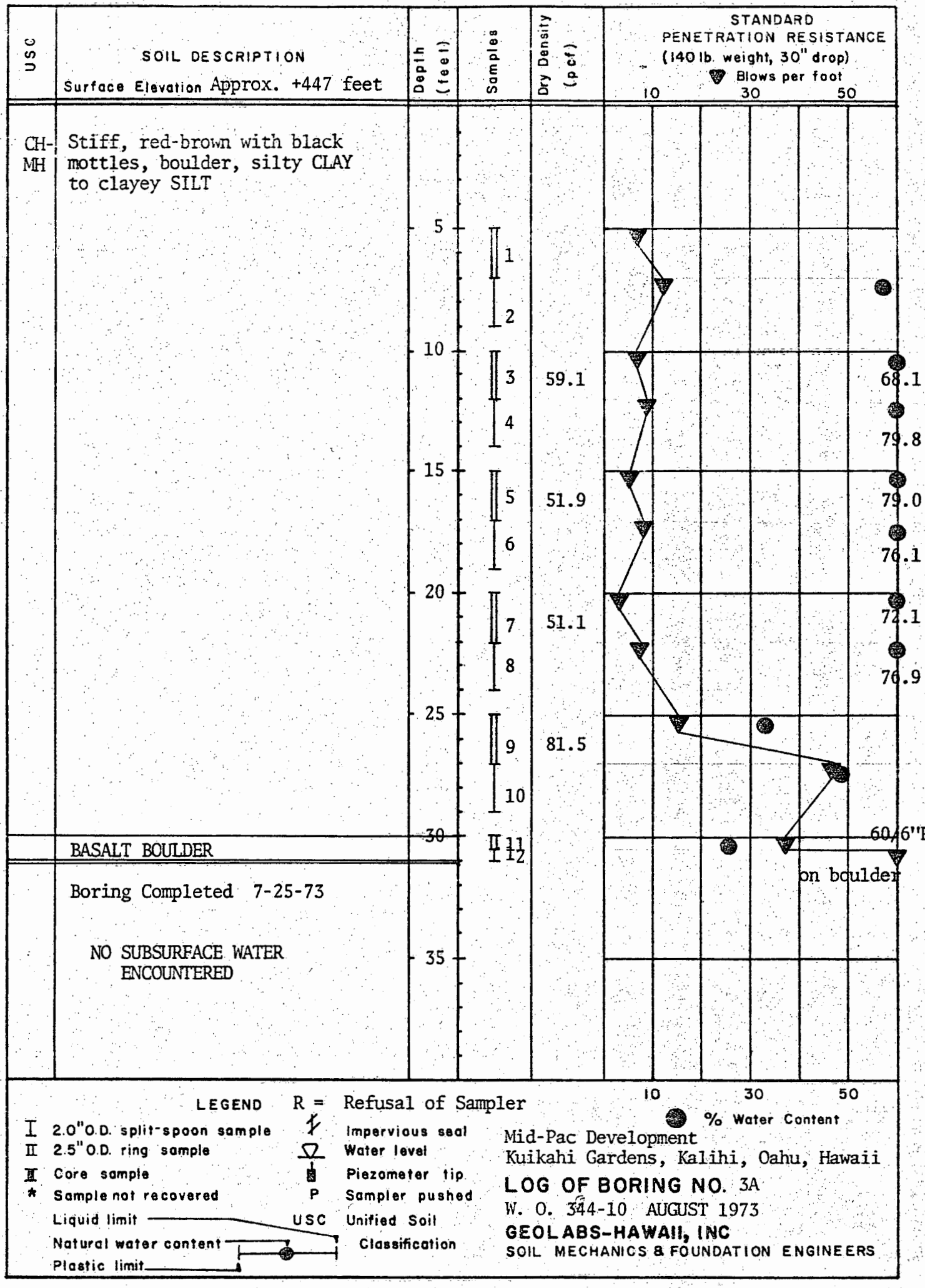
LEGEND

I 2.0"O.D. split-spoon sample
II 2.5"O.D. ring sample
▮ Core sample
* Sample not recovered
Liquid limit
Natural water content
Plastic limit

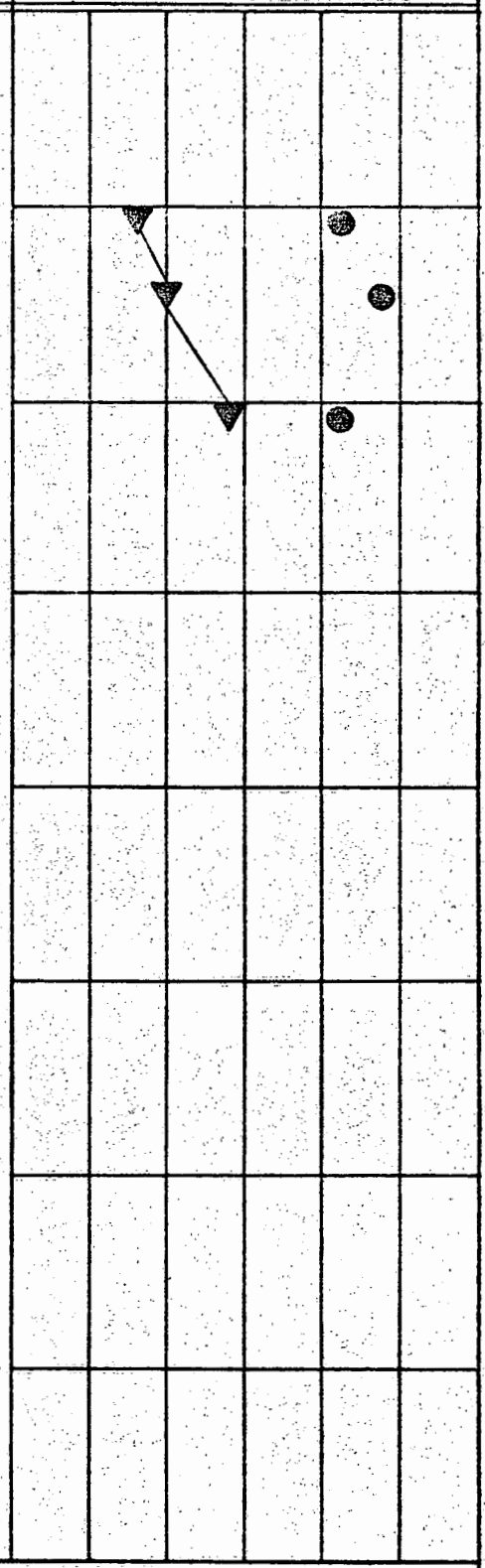
Impervious seal
Water level
Piezometer tip
P Sampler pushed
USC Unified Soil Classification

10 30 50
● % Water Content

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 2A (continued)
W. O. 344-10 AUGUST 1973
GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS


USC
SOIL DESCRIPTION
Surface Elevation Approx. +447 feet
Depth (feet)
Samples
Dry Density (pcf)
STANDARD PENETRATION RESISTANCE
(140 lb. weight, 30" drop)
Blows per foot
10
30
50
CH-MH
Stiff, red-brown with black mottles, boulder, silty CLAY to clayey SILT
5
10
15
20
25
30
35
1
2
3
4
5
6
7
8
9
10
11
12
59.1
51.9
51.1
81.5
68.1
79.8
79.0
76.1
72.1
76.9
60/6"R
on boulder
BASALT BOULDER
Boring Completed 7-25-73
NO SUBSURFACE WATER ENCOUNTERED
LEGEND
I 2.0"O.D. split-spoon sample
II 2.5"O.D. ring sample
III Core sample
* Sample not recovered
Liquid limit
Natural water content
Plastic limit
R = Refusal of Sampler
Impervious seal
Water level
Piezometer tip
P Sampler pushed
USC Unified Soil Classification
% Water Content
Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 3A
W. O. 344-10 AUGUST 1973
GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. +502 feet	Depth (feet)	Samples	Dry Density (pcf)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
CH-MH	Very stiff, red-brown to multi-colored, mottled BOULDER (highly weathered), silty CLAY to clayey SILT	5	1	62.7	
			2		
		10	3		
	Boring Completed 7-31-73 NO SUBSURFACE WATER ENCOUNTERED	15			



LEGEND

- I 2.0" O.D. split-spoon sample
- II 2.5" O.D. ring sample
- X Core sample
- * Sample not recovered
- Liquid limit
- Natural water content
- Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii

LOG OF BORING NO. 4A

W. O. 344-10 AUGUST 1973

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SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. +426 feet	Depth (feet)	Samples	Dry Density (pcf)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
CH-OH	Soft to medium, black, boulder, organic CLAY ("ADOBE")				
CH-MH	Stiff, red-brown, multi-colored, mottled, very moist, silty CLAY to clayey SILT	5	1 2	61.1	
	Stiff, dark brown, very moist, silty CLAY to clayey SILT	10	3		
	Boring Completed 7-31-73 NO SUBSURFACE WATER ENCOUNTERED	15			

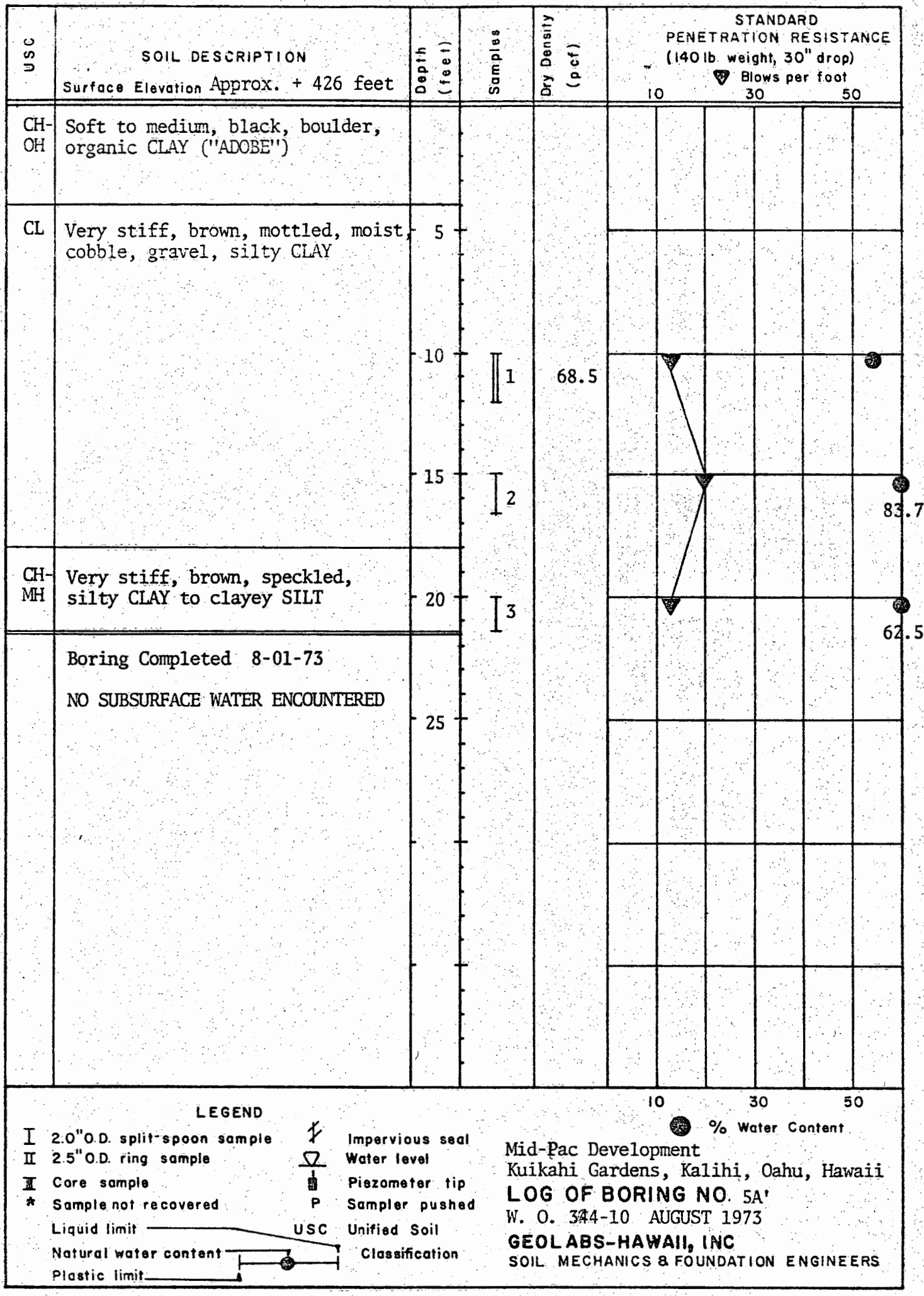
10 30 50

● % Water Content

LEGEND

- I 2.0" O.D. split-spoon sample
- II 2.5" O.D. ring sample
- Core sample
- * Sample not recovered
- Liquid limit
- Natural water content
- Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 5A
W. O. 344-10 AUGUST 1973
GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS


USC
SOIL DESCRIPTION
Surface Elevation Approx. + 426 feet
Depth (feet)
Samples
Dry Density (pcf)
STANDARD PENETRATION RESISTANCE
(140 lb weight, 30" drop)
Blows per foot
10
30
50
CH-OH
Soft to medium, black, boulder, organic CLAY ("ADOBE")
CL
Very stiff, brown, mottled, moist, cobble, gravel, silty CLAY
5
10
15
1
2
68.5
83.7
CH-MH
Very stiff, brown, speckled, silty CLAY to clayey SILT
20
3
62.5
Boring Completed 8-01-73
NO SUBSURFACE WATER ENCOUNTERED
25
10
30
50
% Water Content
LEGEND
I 2.0"O.D. split-spoon sample
II 2.5"O.D. ring sample
III Core sample
* Sample not recovered
Liquid limit
Natural water content
Plastic limit
Impervious seal
Water level
Piezometer tip
P Sampler pushed
USC Unified Soil Classification
Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 5A'
W. O. 344-10 AUGUST 1973
GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. + 460 feet	Depth (feet)	Samples	Dry Density (pcf)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
CH-MH	Very stiff, red-brown, boulder (highly weathered) silty CLAY to clayey SILT	5	1		
		10	2		
	Boring Completed 8-01-73 NO SUBSURFACE WATER ENCOUNTERED	15			
		20			

10 30 50

● % Water Content

LEGEND

I	2.0" O.D. split-spoon sample	⚡	Impervious seal
II	2.5" O.D. ring sample	▽	Water level
III	Core sample		Piezometer tip
*	Sample not recovered	P	Sampler pushed
	Liquid limit	USC	Unified Soil
	Natural water content		Classification
	Plastic limit		

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii
LOG OF BORING NO. 6A
W. O. 344-10 AUGUST 1973

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USC	SOIL DESCRIPTION Surface Elevation Approx. +452 feet	Depth (feet)	Samples	Dry Density (p.c.f)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
CH-MH	Very stiff, red-brown, silty CLAY to clayey SILT	5	1		
		10	2		
	Boring Completed 8-01-73 NO SUBSURFACE WATER ENCOUNTERED	15			

10 30 50

● % Water Content

LEGEND

- I 2.0"O.D. split-spoon sample
- II 2.5"O.D. ring sample
- III Core sample
- * Sample not recovered
- Liquid limit
- Natural water content
- Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii

LOG OF BORING NO. 7A

W. O. 344-10 AUGUST 1973

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SOIL MECHANICS & FOUNDATION ENGINEERS

USC	SOIL DESCRIPTION Surface Elevation Approx. +413 feet	Depth (feet)	Samples	Dry Density (pcf)	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▼ Blows per foot 10 30 50
CH-MH	Very stiff, red-brown, BOULDER (partly weathered), silty CLAY to clayey SILT	5	I 1		● ▼
	STOPPED ON BOULDER				
	Boring Completed 8-01-73 NO SUBSURFACE WATER ENCOUNTERED	10			

LEGEND

- I 2.0"O.D. split-spoon sample
- II 2.5"O.D. ring sample
- Core sample
- * Sample not recovered
- Liquid limit / Natural water content / Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification

10 30 50 ● % Water Content

Mid-Pac Development
Kuikahi Gardens, Kalihi, Oahu, Hawaii

LOG OF BORING NO. 8A

W. O. 344-10 AUGUST 1973

GEOLABS-HAWAII, INC
SOIL MECHANICS & FOUNDATION ENGINEERS

APPENDIX B

Laboratory Testing

LABORATORY TESTING

A laboratory testing program was developed to establish the engineering properties of the soils and rocks encountered at the project site. The tests, where applicable to the subject project, are included in this Appendix.

1. Classification Tests

a) Visual Classification. All soil samples obtained from the borings were brought to our laboratory where they were visually reclassified to confirm or modify the field classification prior to finalizing the Logs of Borings.

b) Water Content Determinations. In addition to visual classification, typical samples were tested for natural water content as an aid in soil classification and in evaluating soil properties. The water content values are based upon the dry weight of the soil.

c) Atterberg Limits. Atterberg limit tests were performed on selected clay and silt samples obtained from the borings for the purposes of identification and correlation of soils. Standard procedures (ASTM D 424 for the plastic limit and ASTM D 423 for the liquid limit) were used in the performance of these tests.

d) Grain Size Analysis. Sieve analysis were performed on granular soils. For fine-grained soils, the hydrometer test was performed to determine the distribution of the grain sizes beyond the No. 200 sieve.

2. Shear Strength Tests

a) Unconfined Compression Tests. Intact core and split-spoon soil samples which apparently exhibited high plasticity were tested for unconfined strength. Length to diameter ratio of 2 was maintained throughout the tests to avoid scatter of test results and to facilitate evaluation of shear strength values for design purposes.

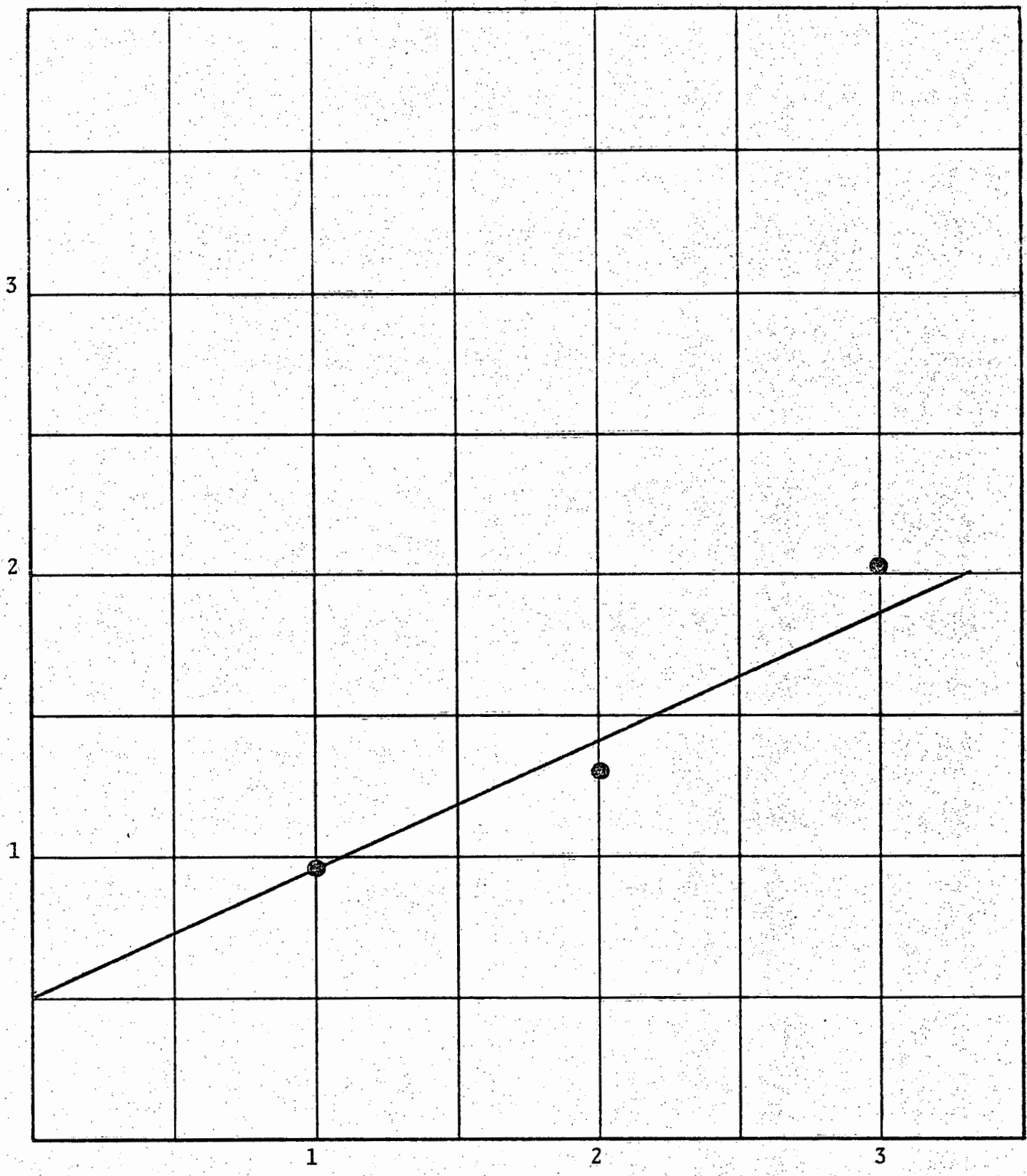
b) Direct Shear Test. In general, soil samples were tested for shear strength using a 2.41 I.D. direct shear box. Each set consisted of at least two tests, each test run under different normal loads. The results are plotted as Normal Stress vs Shear Strength with a failure envelope drawn to determine values of cohesion (c) and angle of frictional resistance (ø).

3. Consolidation Test. Consolidation tests were performed on selected "undisturbed" ring samples of the compressible soils to provide basic data for making settlement calculations. Porous stones were placed on the top and bottom of the samples to allow drainage. Vertical loads were applied in increments with each load increment being allowed to consolidate prior

to adding the next increment. Measurements of the time and consolidation were obtained during each load increment and rebound was measured during the unloading portion. Consolidation test results are plotted in terms of percent settlement versus applied loads.

4. Swell Test. The ring sample was placed between porous stones and a 60 psf load was applied to the sample for a 24-hour period. The difference between the initial and final sample heights is the amount of swell which is expressed as a percentage of the initial height of the sample.

5. Maximum Density Test. Samples of soils are compacted in a mold of given size with a 10-pound rammer dropped 18 inches to determine the relationship between moisture content and density of the soil. At least three trial points at different moisture content are run to determine the maximum density and optimum moisture content. The test is run in accordance with ASTM D-1557-70.



Boring No. 1A
Sample No. 3
Depth @ 10'-12'
ϕ = 23.5°
c = 500 psf

DIRECT SHEAR TEST

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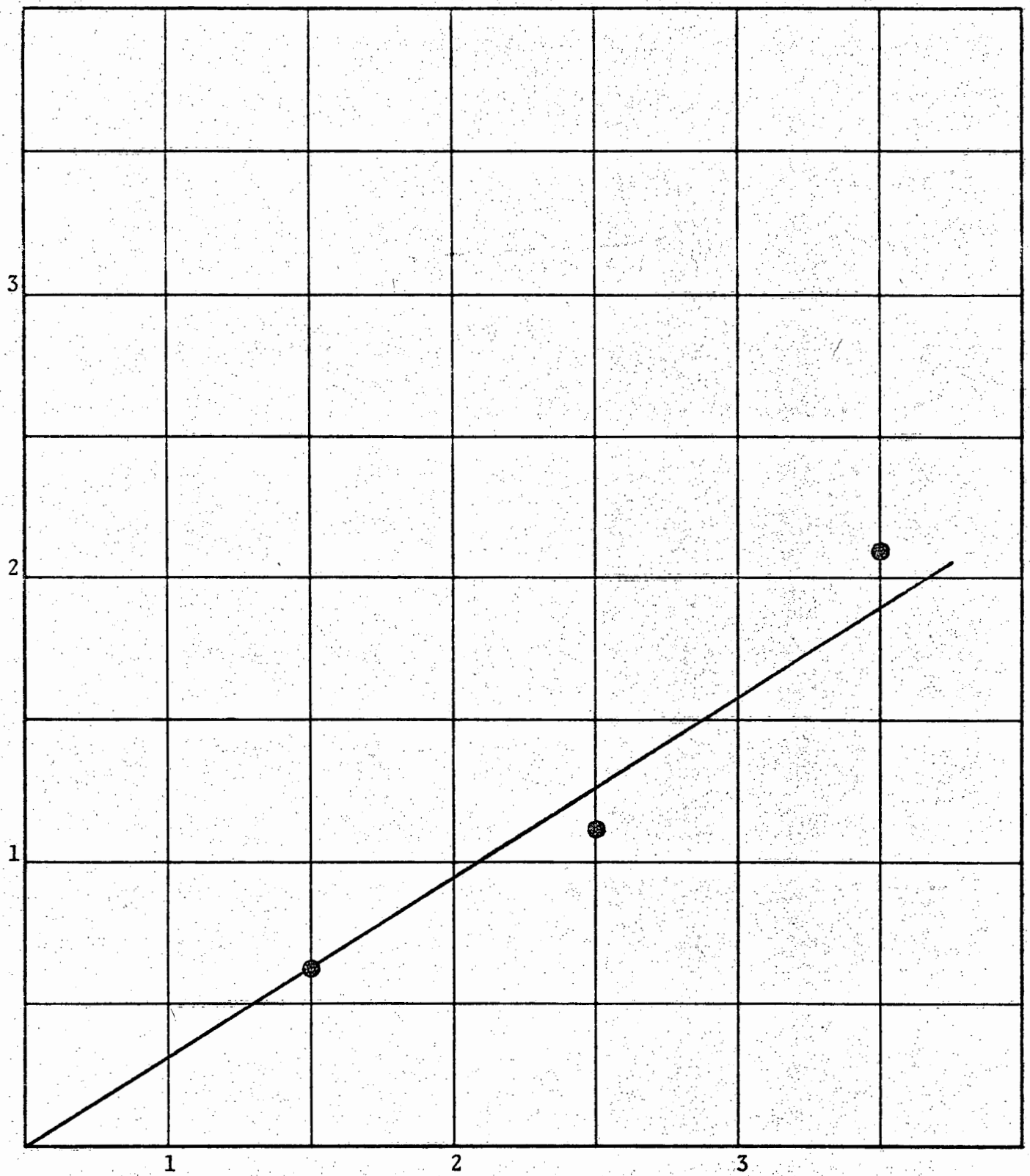
DATE	W.O.
August 1973	344-10

PLATE B-1



Boring No. 1A
Sample No. 5
Depth @ 15'-16.1'
ϕ = 32°
c = 0 psf

DIRECT SHEAR TEST

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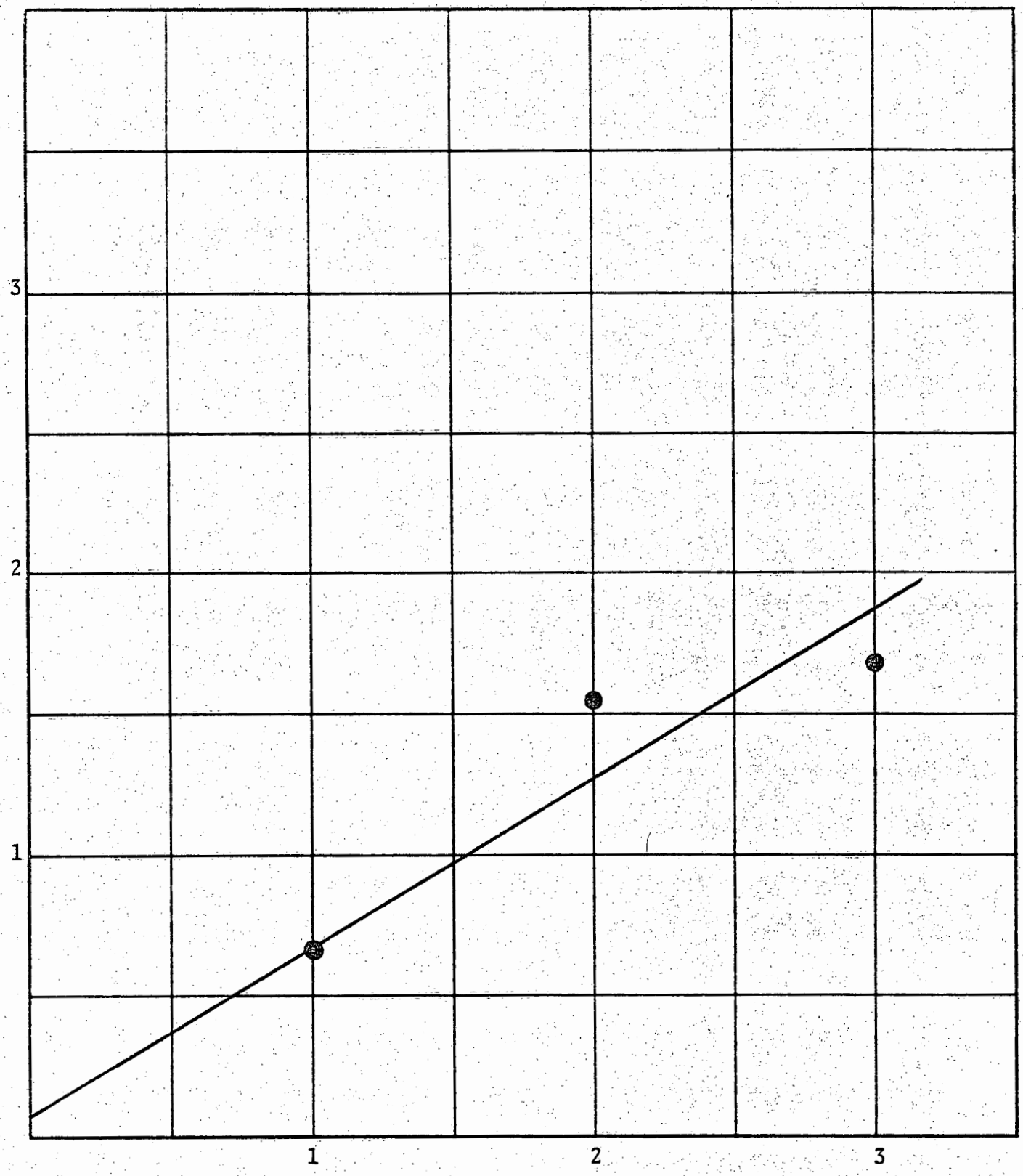
Foundation & Soil Engineering · Geology

DATE August 1973 | W.O. 344-10

PLATE B-2



Boring No. 1A
Sample No. 7
Depth @ 20'-21.5'
ϕ = 30°
c = 70 psf

DIRECT SHEAR TEST

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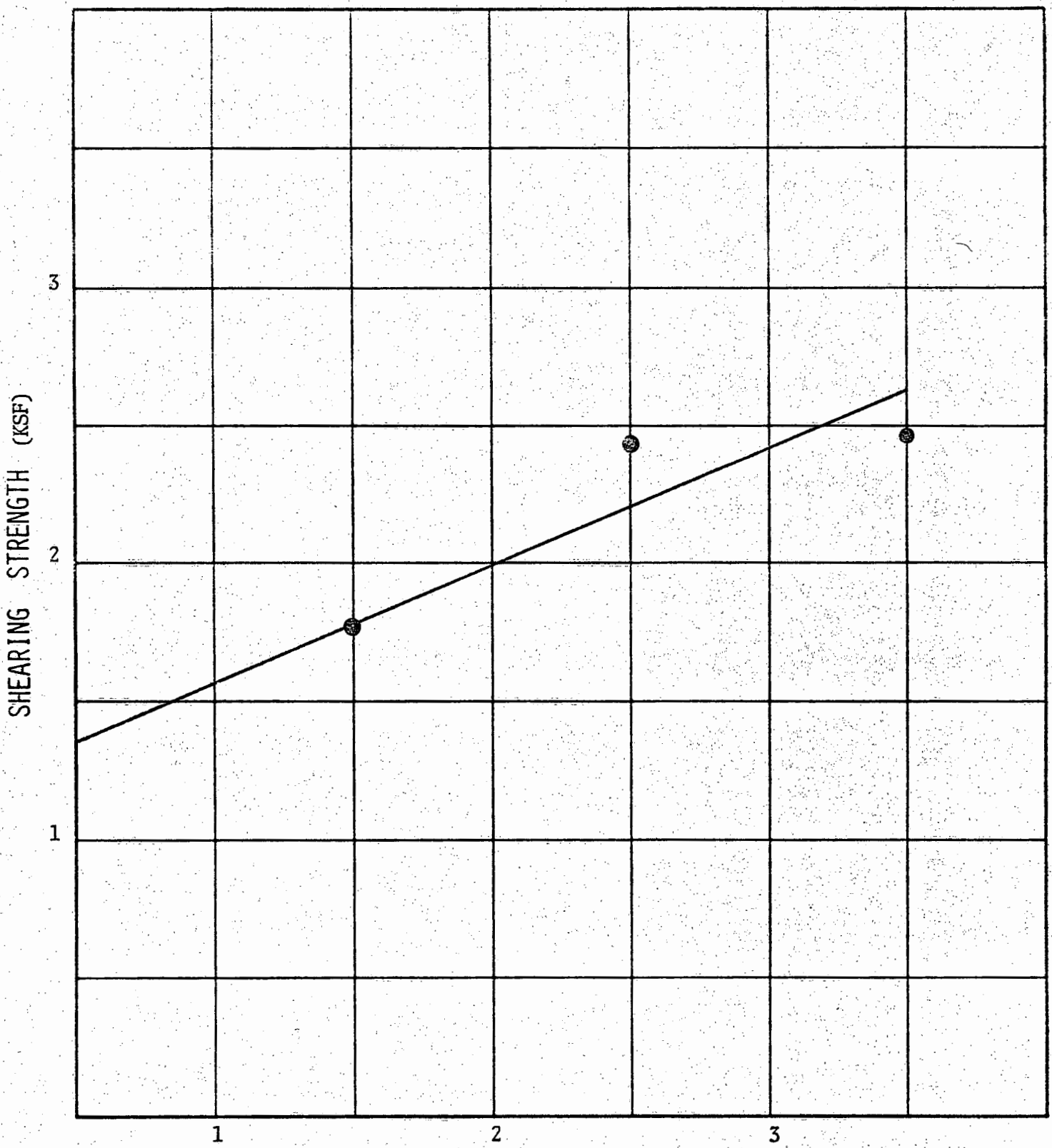
DATE	W.O.
August 1973	344-10

PLATE B-3



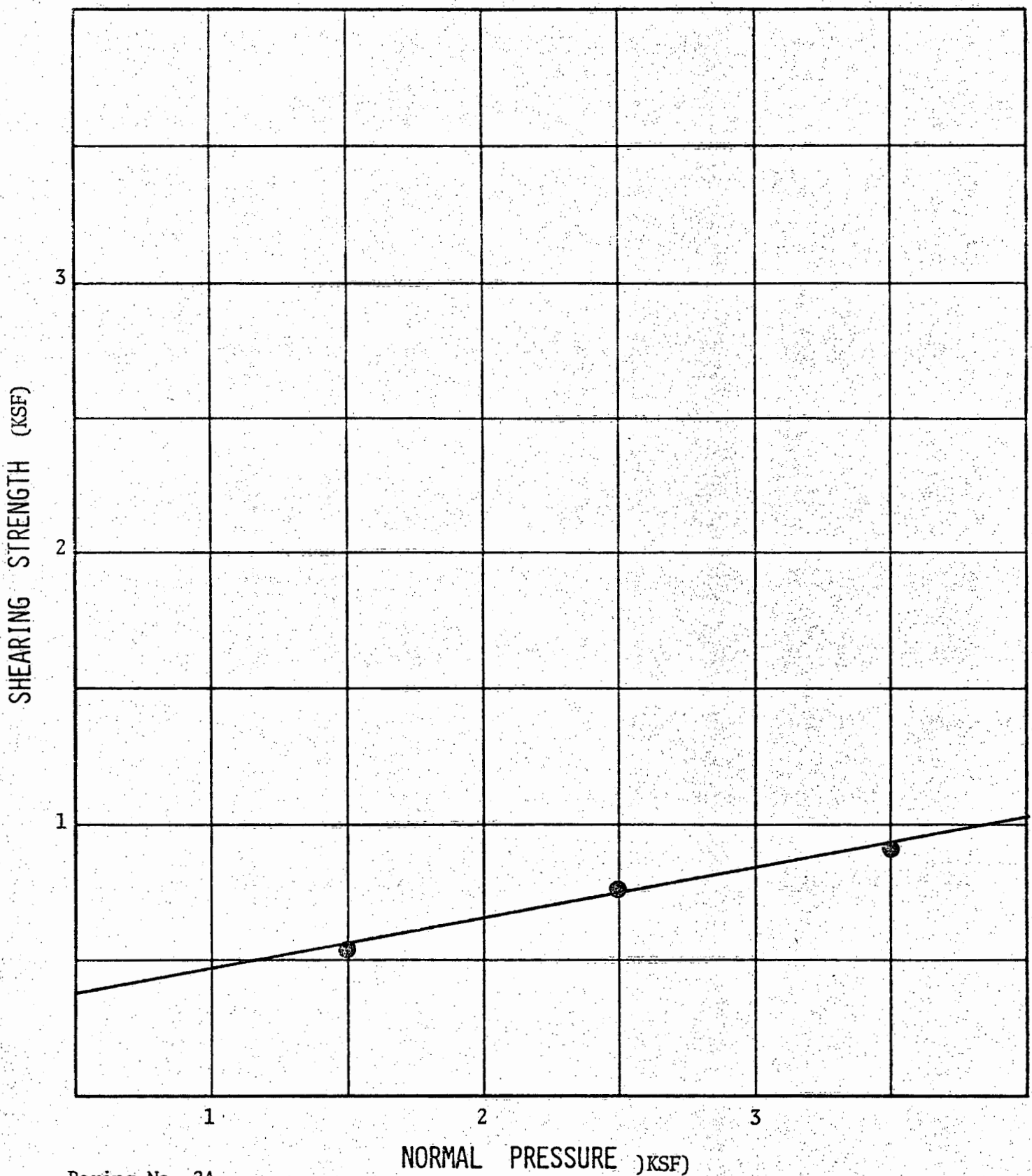
Boring No. 1A
Sample No. 13
Depth @ 46'-48'
ϕ = 22°
c = 1360 psf

DIRECT SHEAR TEST

GEOLABS-HAWAII. INC.
Foundation & Soil Engineering · Geology

DATE	W.O.
August 1973	344-10

PLATE B-4



Boring No. 2A
Sample No. 4
Depth @ 15'
ϕ = 10°
c = 390 psf

DIRECT SHEAR TEST

GEOLABS-HAWAII. INC.
Foundation & Soil Engineering · Geology

DATE August 1973

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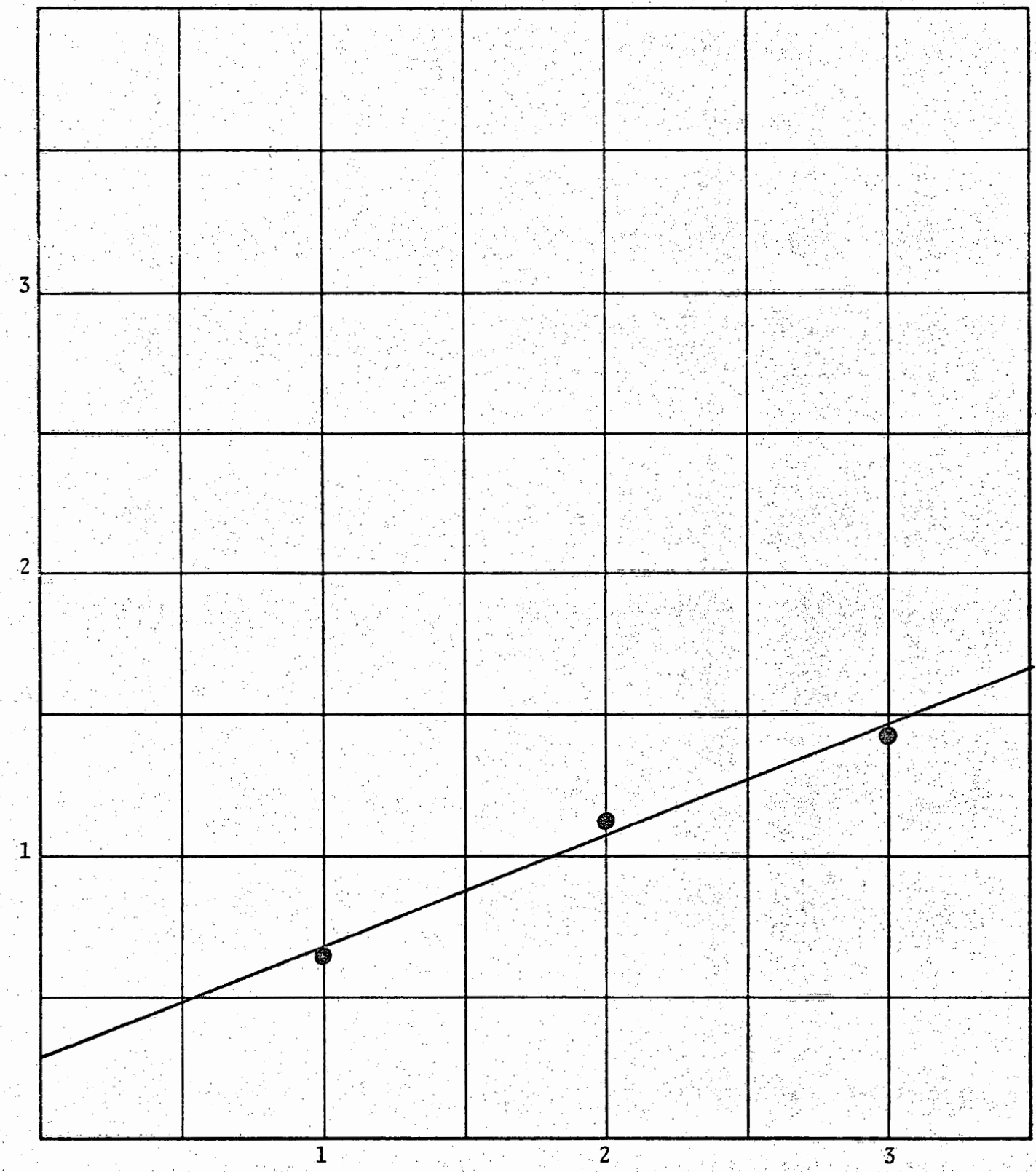
PLATE B-5



Boring No. 3A
Sample No. 3
Depth @ 10'
ϕ = 21°
c = 300 psf

DIRECT SHEAR TEST

GEOLABS-HAWAII. INC.
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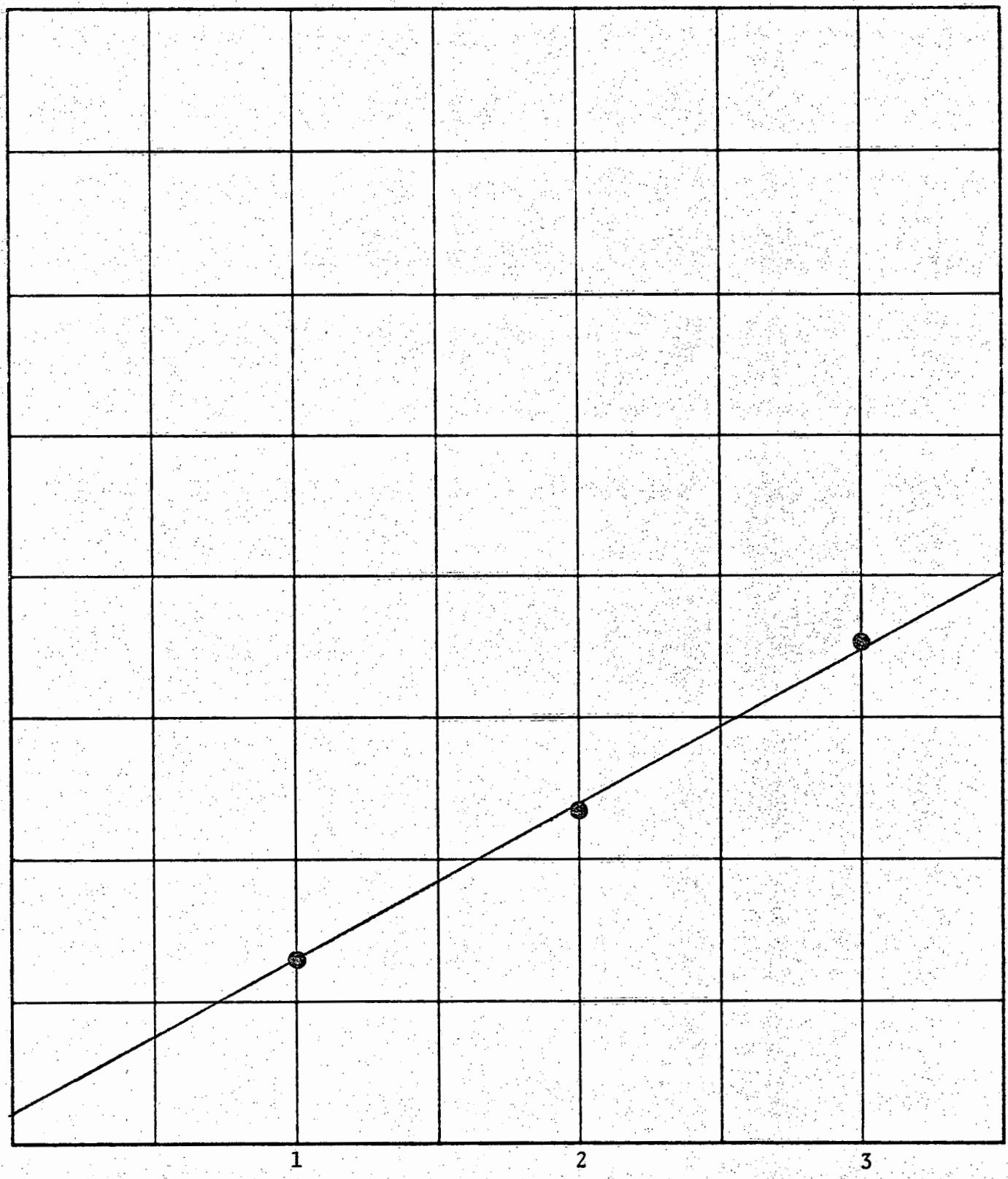
DATE August 1973

W.O. 344-10

PLATE B-6



Boring No. 3A
Sample No. 5
Depth @ 15'
ϕ = 28°
c = 110 psf

DIRECT SHEAR TEST

GEOLABS-HAWAII. INC.
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DATE August 1973 | W.O. 344-10

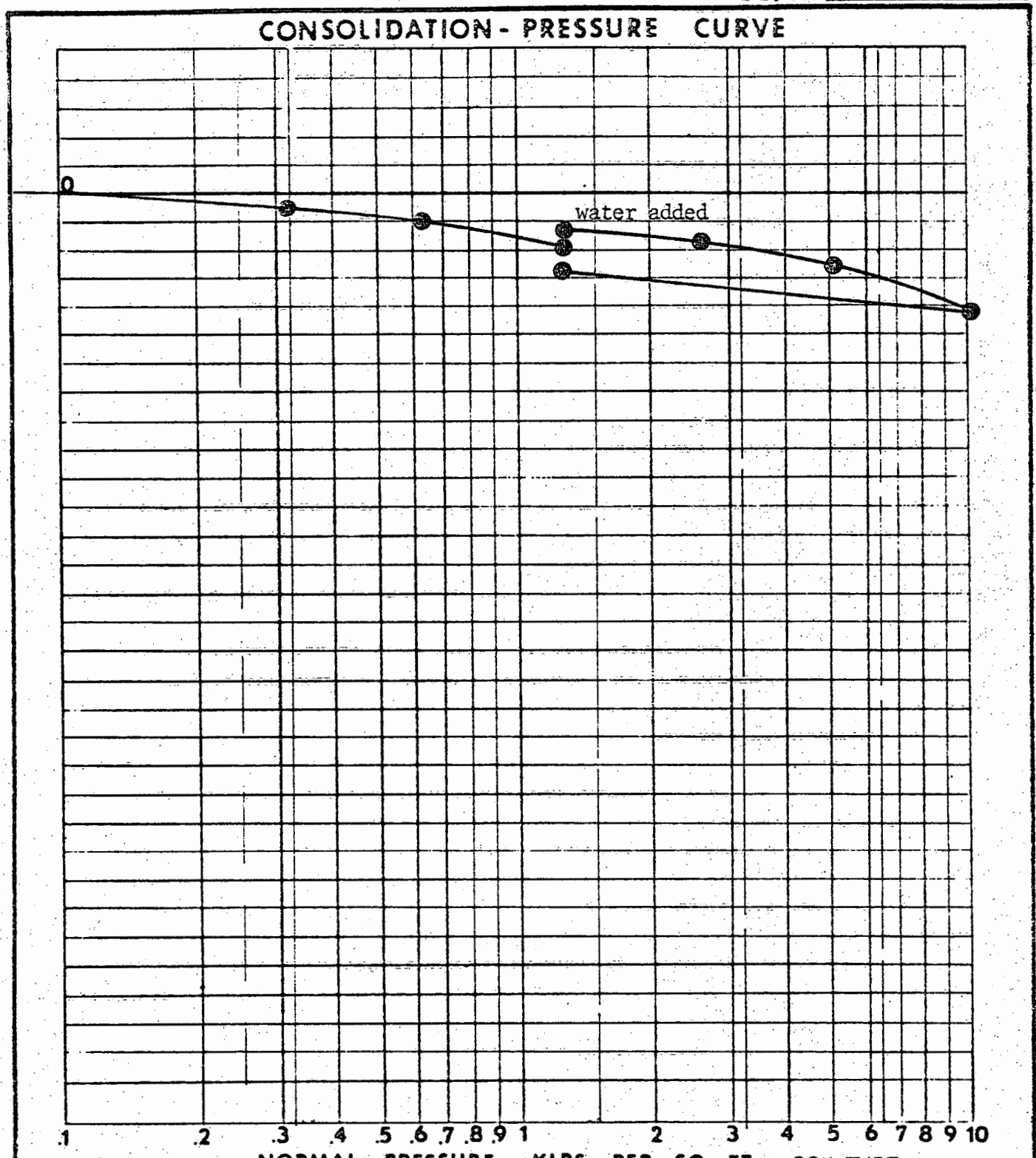
PLATE B-7

GEOLABS—HAWAII, INC.

DATE August 10, 1973 W.O. 344-10

JOB MidPac Development-Kuikahi Gardens BORING NO. 2A, S-4

DEPTH 15'



SOIL TYPE

DRY UNIT WT. PCF

LIQUID LIMIT %

PLASTIC LIMIT %

PLASTIC INDEX %

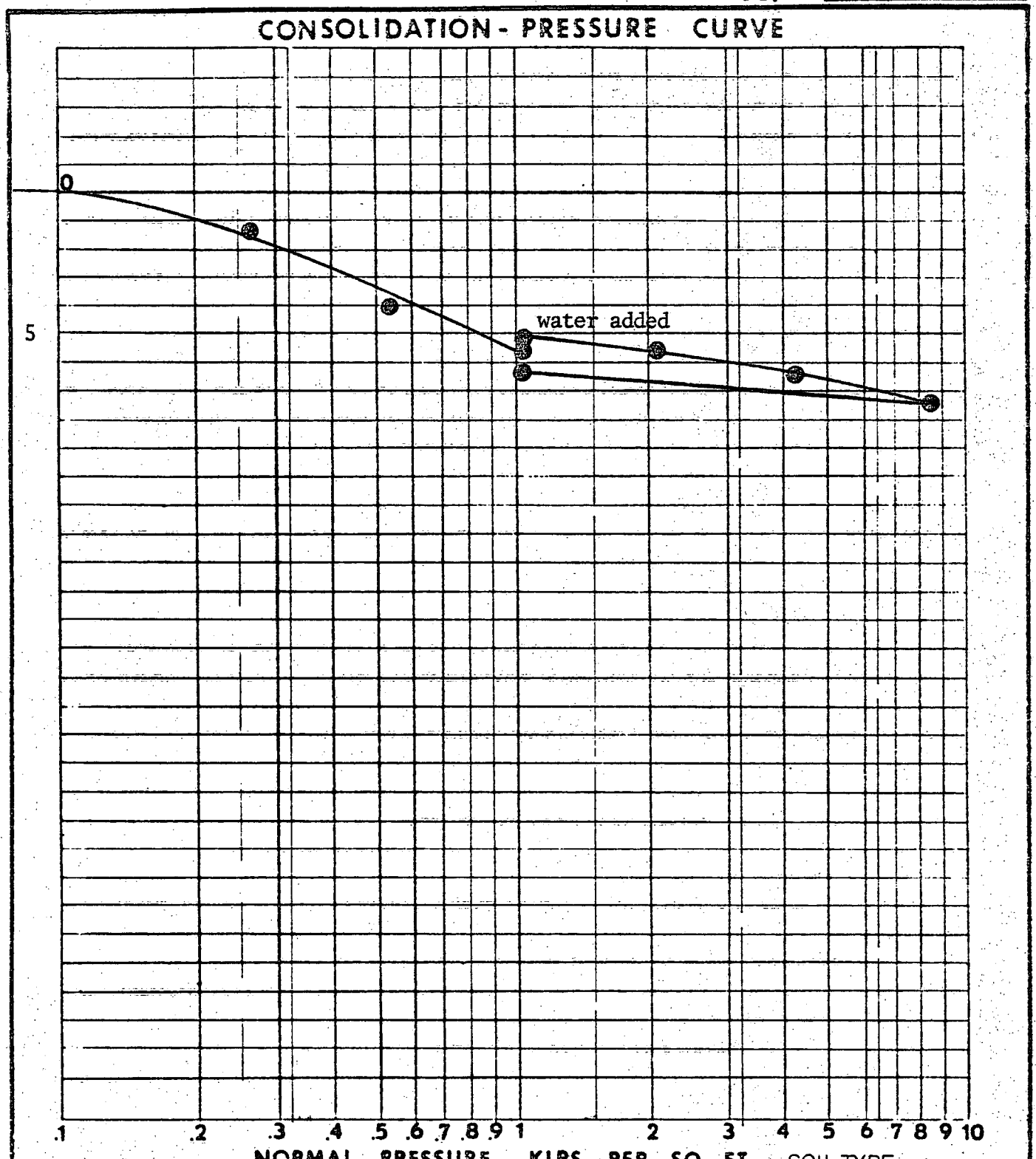
PLATE B-8

GEOLABS—HAWAII, INC.

DATE August 10, 1973 W.O. 344-10

JOB MidPac Development-Kuikahi Gardens BORING NO. 2A, S-6

DEPTH 20'



SOIL TYPE

DRY UNIT WT. PCF

LIQUID LIMIT %

PLASTIC LIMIT %

PLASTIC INDEX %

PLATE B-9

GEOLABS—HAWAII, INC.

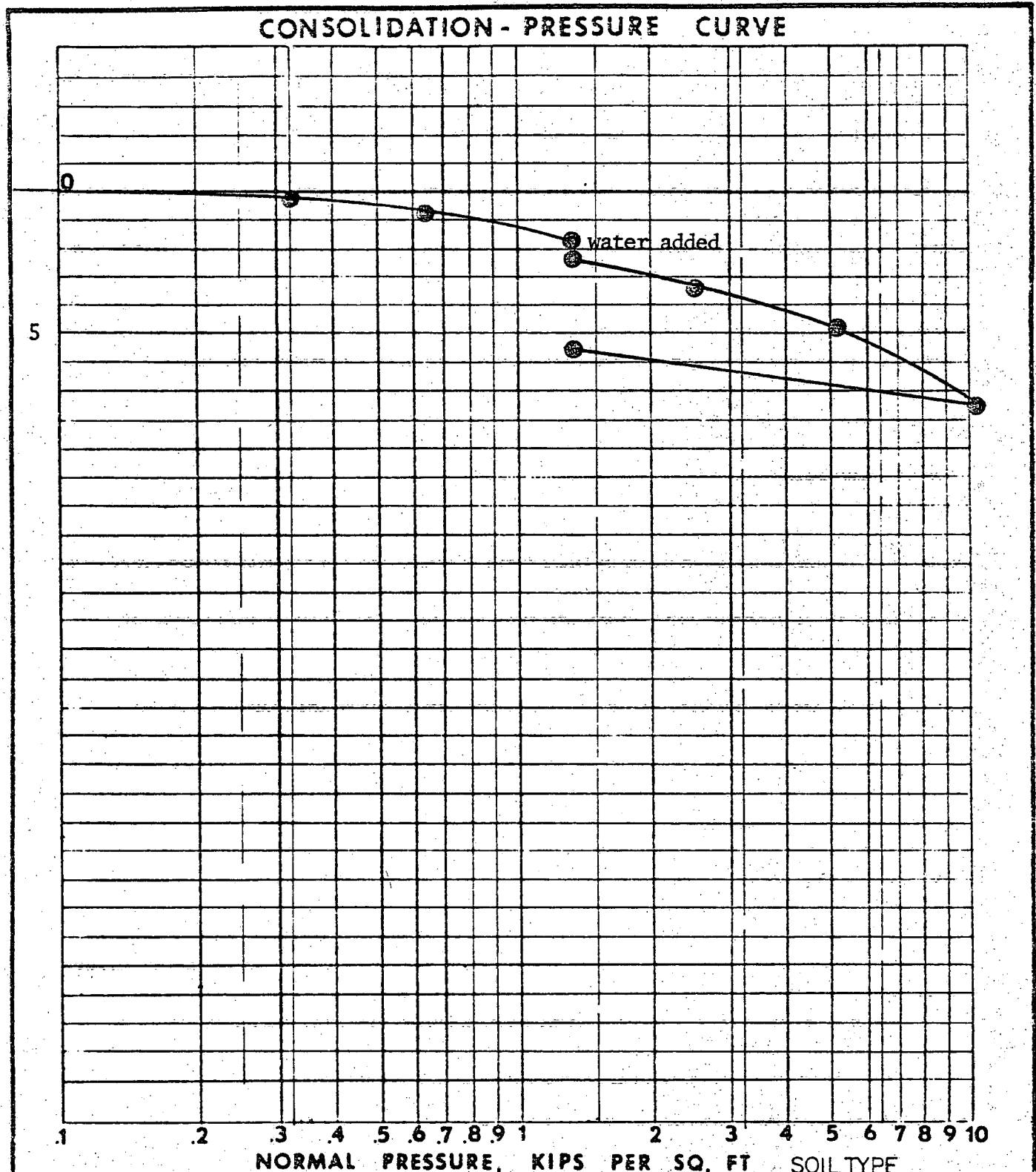
DATE August 10, 1973

W.O. 344-10

JOB MidPac Development-Kuikahi Gardens

BORING NO. 3A, S-1

DEPTH 5'



SOIL TYPE

DRY UNIT WT. PCF

LIQUID LIMIT %

PLASTIC LIMIT %

PLASTIC INDEX %

PLATE B-10

GEOLABS—HAWAII, INC.

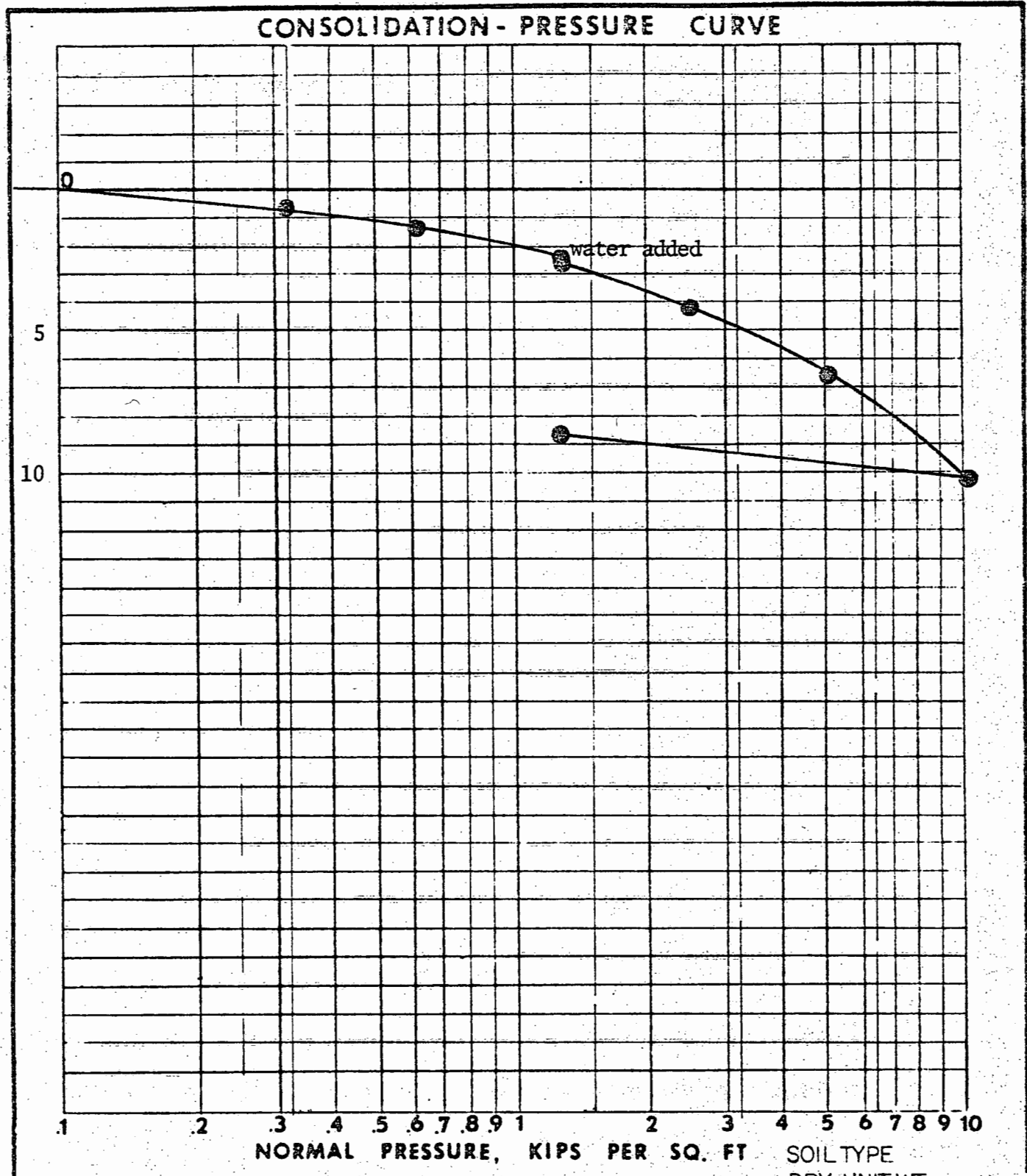
DATE August 10, 1973

W.O. 344-10

JOB MidPac Development - Kuikahi Gardens

BORING NO. 3A, S-5

DEPTH 15'



SOIL TYPE

DRY UNIT WT. PCF

LIQUID LIMIT %

PLASTIC LIMIT %

PLASTIC INDEX %

PLATE B-11